

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A mirror assembly security system for a vehicle comprising:
a first exterior mirror assembly including a first reflective element and a first housing for said first reflective element;
a first light module removably positioned in said first housing, said first light module projecting light from said first housing on at least a first area adjacent a first portion of the vehicle in order to create a first lighted security zone in said first area; and
said first light module including a first enclosure, a first light-transmitting opening in said first enclosure facing at least one of generally downwardly and rearwardly of said vehicle, a first cover for said first light-transmitting opening, and a first light source in said first enclosure radiating light through said first light-transmitting opening.
2. The mirror assembly security system in claim 1 including a first socket positioned in another opening in said first enclosure and including a means for sealing said first socket in said another opening, whereby said first light source can be replaced by removing said first light module from said housing and removing said socket from said first light module.
3. The mirror assembly security system in claim 1 including a light-directing surface at least partially surrounding said first light source in said first enclosure.

4. The mirror assembly security system in claim 3 wherein said light-directing surface is configured to direct light generally along a given axis and wherein said axis slopes rearwardly downwardly of the vehicle, wherein a portion of said first light module is positioned in said first housing behind said first reflective element.

5. The mirror assembly security system in claim 1 wherein said first enclosure slopes from said cover rearwardly and upwardly to a location behind said first reflective element.

6. The mirror assembly security system in claim 1 wherein said first cover is an optical lens.

7. The mirror assembly security system in claim 6 wherein said lens is selected from the group consisting of a diffusive optic, a diffractive optic, a refractive optic, a reflective optic, a holographic optic, a binary optic, a clear optic, and a sinusoidal optic.

8. The mirror assembly security system in claim 7 wherein said lens is a clear optic.

9. The mirror assembly security system in claim 2 wherein said first module is substantially moisture impervious.

10. The mirror assembly security system in claim 9 including means defining an airflow path through said first enclosure in order to dissipate heat from said first light source.

11. The mirror assembly security system in claim 1 wherein said module is mounted in said first housing in a manner that defines a drain from said housing for water in said first housing.

12. The mirror assembly security system in claim 1 including a second light-transmitting opening in said first enclosure facing at least one of generally downwardly and rearwardly of said vehicle, a second cover for said second light-transmitting opening, and a second light source in said second enclosure radiating light through said second light-transmitting opening.

13. The mirror assembly security system in claim 12 wherein said first light-transmitting opening is facing generally downwardly of said vehicle and said second light-transmitting opening is facing generally rearwardly of said vehicle.

14. The mirror assembly security system in claim 13 wherein said first light source is one of an incandescent lamp, a halogen lamp, at least one light-emitting diode, a vacuum fluorescent lamp, and a light pipe connected between a light source in said vehicle and said first enclosure.

15. The mirror assembly security system in claim 14 wherein said first light source is an incandescent lamp.

16. The mirror assembly security system in claim 13 wherein said second light source is one of an incandescent lamp, a halogen lamp, at least one light-emitting diode, a

vacuum fluorescent lamp, and a light pipe connected between a light source in said vehicle and said first enclosure.

17. The mirror assembly security system in claim 16 wherein said second light source is a plurality of light-emitting diodes.

18. The mirror assembly security system in claim 17 including louvers between said light-emitting diodes.

19. The mirror assembly security system in claim 18 wherein said louvers are skewed in a direction away from the vehicle passenger compartment in order to shield the driver from light radiated by said light-emitting diodes.

20. The mirror assembly security system in claim 19 wherein said louvers are skewed at an angle of at least approximately 15° from the longitudinal axis of the vehicle.

21. The mirror assembly security system in claim 20 wherein said louvers are skewed at an angle of between approximately 25° and approximately 30° from the longitudinal axis of the vehicle.

22. The mirror assembly security system in claim 1 including mating surface configurations on said first housing and said first enclosure which at least partially retain said first enclosure in said first housing.

23. The mirror assembly security system in claim 21 wherein said mating surface configuration includes a tongue-and-groove configuration.

24. The mirror assembly security system in claim 21 wherein said mating surface configuration includes at least one pair of deflectable prongs on one of said first housing and said first enclosure that snap-fit within a socket on the other of said first housing and said first enclosure.

25. The mirror assembly security system in claim 21 wherein said mating surface configuration includes at least one guide member on one of said first housing and said first enclosure retained in a doghouse connector on the other of said first housing and said first enclosure by a deflectable clip.

26. The mirror assembly security system in claim 1 wherein said first enclosure is made from a heat-resistant polymer.

27. The mirror assembly security system of claim 26 wherein said polymer has a heat distortion temperature of at least approximately 80° C.

28. The mirror assembly security system in claim 26 wherein said polymer is selected from the group consisting of polycarbonate, polyester, nylon, and ABS.

29. The mirror assembly security system in claim 26 including a light-directing surface at least partially surrounding said light source, said light-directing surface being vacuum-metalized to said first enclosure.

30. The mirror assembly security system of claim 1 wherein said first exterior mirror assembly is a driver-side exterior mirror assembly.

31. The mirror assembly security system of claim 1 wherein said first exterior mirror assembly is a passenger-side exterior mirror assembly.

32. The mirror assembly security system of claim 30 further including a second exterior mirror assembly having a second reflective element and a second housing for said second reflective element, and a second light module removably positioned in said second housing, said second light module projecting light from said second housing on at least a second area adjacent a second portion of the vehicle in order to create a second lighted security zone in said second area, said second exterior mirror assembly being a passenger-side exterior mirror assembly, and said second light module including a second enclosure, a second light-transmitting opening in said second enclosure facing at least one of generally downwardly and rearwardly of said vehicle, a second cover for said second light-transmitting opening, and a second light source in said second enclosure radiating light through said second light-transmitting opening.

33. The mirror assembly security system of claim 32 including a second socket positioned in another opening in said second enclosure and including second means for

sealing said second socket in said another opening in said second enclosure, whereby said second light source can be replaced by removing said second light module from said second housing and removing said second socket from said second light module.

34. The mirror assembly security system of claim 32 wherein at least one of said first light source and said second light source selected from the group consisting of an incandescent lamp, a halogen lamp, a light-emitting diode, a vacuum fluorescent lamp, and a light pipe connecting between a light source in the vehicle and at least one of said first housing and said second housing.

35. The mirror assembly security system of claim 33 wherein said first cover is a non-filtering lens and said second cover is a non-filtering lens.

36. The mirror assembly security system of claim 35 wherein each of said first pattern of light and said second pattern of light is substantially white light.

37. The mirror assembly security system of claim 32 wherein at least one of said first reflective element and said second reflective element is an electro-optic mirror.

38. The mirror assembly security system of claim 37 wherein said electro-optic mirror is an electrochromic mirror.

39. The mirror assembly security system of claim 38 wherein said electrochromic mirror is an electrochemichromic mirror.

40. The mirror assembly security system of claim 1 wherein said first reflective element is an electro-optic mirror.

41. The mirror assembly security system of claim 40 wherein said electro-optic mirror is an electrochromic mirror.

42. The mirror assembly security system of claim 41 wherein said electrochromic mirror is an electrochemichromic mirror.

43. A mirror assembly security system for a vehicle comprising:
an exterior mirror assembly including a reflective element, a housing for said reflective element and a positioning device for adjustably positioning said reflective element in said first housing;

a light module removably positioned in said housing, said module projecting light from said housing on at least an area adjacent a portion of the vehicle in order to create a lighted security zone in said area; and

said light module including an enclosure having wall means defining a first enclosure cavity, a first light-transmitting opening in said first cavity facing at least one of generally downwardly and rearwardly of said vehicle, a first cover for said first light-transmitting opening, and a first light source in said first cavity radiating light generally along a first axis through said first light-transmitting opening, said enclosure positioned in an opening in a surface of said housing facing at least one of generally downwardly and rearwardly of said vehicle and said enclosure sloping generally upwardly from said first light-transmitting opening to a location behind said positioning device.

44. The mirror assembly security system in claim 43 wherein said first light-radiating axis slopes upwardly forwardly with respect to said vehicle.

45. The mirror assembly security system in claim 43 including another opening in said first cavity, a first socket positioned in said another opening and including a first gasket for sealing said first socket in said another opening, whereby said first light source can be replaced by removing said first light module from said housing and removing said socket from said light module.

46. The mirror assembly security system in claim 43 including a light-directing surface at least partially surrounding said first light source in said first cavity for directing light along said first axis.

47. The mirror assembly security system in claim 43 wherein said first cover is an optical lens.

48. The mirror assembly security system in claim 47 wherein said lens is selected from the group consisting of a diffusive optic, a diffractive optic, a refractive optic, a reflective optic, a holographic optic, a binary optic, a clear optic, and a sinusoidal optic.

49. The mirror assembly security system in claim 48 wherein said lens is a clear optic.

50. The mirror assembly security system in claim 43 wherein said light module is substantially moisture impervious.

51. The mirror assembly security system in claim 43 including a second enclosure cavity, a second light-transmitting opening in said second cavity facing at least one of generally downwardly and rearwardly of said vehicle, a second cover for said second light-transmitting opening, and a second light source in said second cavity radiating light generally
5 along a second axis through said second light-transmitting opening.

52. The mirror assembly security system in claim 51 wherein said first light-transmitting opening is facing generally downwardly of said vehicle and said second light-transmitting opening is facing generally rearwardly of said vehicle.

53. The mirror assembly security system in claim 52 wherein said first light source is one of an incandescent lamp, a halogen lamp, at least one light-emitting diode, a vacuum fluorescent lamp, and a light pipe connected between a light source in said vehicle and said first enclosure.

54. The mirror assembly security system in claim 53 wherein said first light source is an incandescent lamp.

55. The mirror assembly security system in claim 52 wherein said second light source is one of an incandescent lamp, a halogen lamp, at least one light-emitting diode, a

vacuum fluorescent lamp, and a light pipe connected between a light source in said vehicle and said first enclosure.

56. The mirror assembly security system in claim 55 wherein said second light source is a plurality of light-emitting diodes.

57. The mirror assembly security system in claim 56 wherein said second light-radiating axis extends rearwardly away from the vehicle passenger compartment.

58. The mirror assembly security system in claim 57 wherein said second light-radiating axis is at an angle of at least approximately 15° from the longitudinal axis of the vehicle.

59. The mirror assembly security system in claim 58 wherein said second light-radiating axis is at an angle of between approximately 25° and approximately 30° from the longitudinal axis of the vehicle.

60. The mirror assembly security system in claim 56 including louvers between said light-emitting diodes.

61. The mirror assembly security system in claim 60 wherein said louvers are skewed in a direction away from the vehicle passenger compartment in order to shield the driver from light radiated by said light-emitting diodes.

62. The mirror assembly security system in claim 43 including mating surface configurations on said housing and said enclosure which at least partially retain said enclosure in said housing.
63. The mirror assembly security system in claim 62 wherein said mating surface configuration includes a tongue-and-groove configuration.
64. The mirror assembly security system in claim 62 wherein said mating surface configuration includes at least one pair of deflectable prongs on one of said housing and said enclosure that snap-fit within a socket in the other of said housing and said enclosure.
65. The mirror assembly security system in claim 62 wherein said mating surface configuration includes at least one guide member on one of said housing and said enclosure retained in a doghouse connector on the other of said housing and said enclosure by a deflectable clip.
66. The mirror assembly security system in claim 43 wherein said enclosure is made from a heat-resistant polymer.
67. The mirror assembly security system in claim 66 wherein said polymer has a heat distortion temperature of at least approximately 80° C.
68. The mirror assembly security system in claim 66 wherein said polymer is selected from the group consisting of polycarbonate, polyester, nylon, and ABS.

69. The mirror assembly security system in claim 66 including a light-directing surface at least partially surrounding said first light source, said light-directing surface being vacuum-metalized to wall means defining said light-generating cavity.

70. The mirror assembly security system of claim 43 wherein said exterior mirror assembly is a driver-side exterior mirror assembly.

71. The mirror assembly security system of claim 43 wherein said exterior mirror assembly is a passenger-side exterior mirror assembly.

72. The mirror assembly security system of claim 43 wherein said reflective element is an electro-optic mirror.

73. The mirror assembly security system of claim 72 wherein said electro-optic mirror is an electrochromic mirror.

74. The mirror assembly security system of claim 73 wherein said electrochromic mirror is an electrochemichromic mirror.

75. A light module adapted to be removably positioned in an opening in a vehicle exterior mirror assembly having a housing and a retaining structure located within said housing, comprising:

an enclosure having wall means defining a first enclosure cavity;

a first light-transmitting opening in said first enclosure cavity;

a first cover for said first light-transmitting opening;
a first light source in said first enclosure cavity radiating light through said
first light-transmitting opening; and

a retaining structure on an exterior surface of said enclosure configured to
10 mate with the retaining structure within the exterior mirror housing in order to at least
partially retain said enclosure in the exterior mirror housing.

76. The light module in claim 75 wherein said retaining structure includes a
tongue-and-groove configuration.

77. The light module in claim 75 wherein said retaining structures includes at least
one pair of deflectable prongs and a socket wherein said prongs snap fit within said socket.

78. The light module in claim 75 wherein said retaining structure includes at least
one guide member retained in a doghouse connector by a deflectable clip.

79. The light module in claim 75 wherein said enclosure is made from a heat-
resistant polymer.

80. The light module in claim 79 wherein said polymer has a heat distortion
temperature of at least approximately 80° C.

81. The light module in claim 79 including a light-directing surface at least partially surrounding said first light source, said light-directing surface being vacuum-metalized to wall means defining said enclosure cavity.

82. The light module in claim 79 including a light-directing surface at least partially surrounding said first light source, said light-directing surface being vacuum-metalized to wall means defining said enclosure cavity.

83. The light module in claim 75 including a first socket positioned in another opening in said first cavity and including a first gasket for sealing said first socket in said another opening, whereby said first light source can be replaced by removing said first light module from said housing and removing said socket from said light module.

84. The light module in claim 75 including a light-directing surface at least partially surrounding said first light source.

85. The light module in claim 75 wherein said first cover is an optical lens.

86. The light module in claim 85 wherein said lens is selected from the group consisting of a diffusive optic, a diffractive optic, a refractive optic, a reflective optic, a holographic optic, a binary optic, a clear optic, and a sinusoidal optic.

87. The light module in claim 86 wherein said lens is a clear optic.

88. The light module in claim 75 including a second enclosure cavity, a second light-transmitting opening in said second enclosure cavity, a second cover for said second light-transmitting opening, and a second light source in said second enclosure cavity radiating light through said second light-transmitting opening.

89. The light module in claim 88 wherein said first light source is one of an incandescent lamp, a halogen lamp, at least one light-emitting diode, a vacuum fluorescent lamp, and a light pipe connected between a light source in said vehicle and said first enclosure.

90. The light module in claim 89 wherein said first light source is an incandescent lamp.

91. The light module in claim 88 wherein said second light source is one of an incandescent lamp, a halogen lamp, at least one light-emitting diode, a vacuum fluorescent lamp, and a light pipe connected between a light source in said vehicle and said first enclosure.

92. The light module in claim 91 wherein said second light source is a plurality of light-emitting diodes.

93. The light module in claim 92 including louvers between said light-emitting diodes.

94. A mirror assembly security system for a vehicle comprising:

an exterior mirror assembly attached to the vehicle, a reflective element, a housing for said reflective element, and a positioning device mounted to said reflective element for adjustably positioning said reflective element in said housing;

5 a light module removably positioned in said housing, said light module projecting light from said housing on at least an area adjacent a portion of the vehicle in order to create a lighted security zone in said area;

said light module including an enclosure having wall means defining an enclosure cavity, a light-transmitting opening in said cavity, a cover for said light-transmitting opening and a light source in said cavity radiating light through said light-transmitting opening; and

mating retaining elements for removably retaining said light module in said housing.

95. The mirror assembly security system in claim 94 wherein said mating retaining elements include at least one pair of prongs and a socket wherein said prongs releasably engage said socket.

96. The mirror assembly security system in claim 94 wherein said mating retaining elements include at least one guide member retained in a doghouse connector by a deflectable clip.

97. The mirror assembly security system of claim 2 wherein said sealing means comprises a polymer material having a durometer hardness in the range of from about 50 to about 95 SHORE A.

98. The mirror assembly system of claim 2 wherein said socket is at least partially formed of a resilient polymer material so as to be self-gasketing at its mating surface to said first enclosure.

99. The mirror assembly system of claim 83 wherein said first gasket comprises a polymer material having a durometer hardness in the range of about 50 to about 95 SHORE A.

100. The mirror assembly system of claim 99 wherein said first socket is at least partially formed of a resilient polymer material so as to be self-gasketing at its mating surface to said enclosure.

101. A light module adapted to be removably positioned in an opening in a vehicle exterior mirror assembly having a housing comprising:

an enclosure having walls defining an enclosure cavity;

a light-transmitting opening in said enclosure cavity;

said opening being covered with a lens;

a light source in said enclosure cavity radiating light through said opening;

and

a first socket positioned in another opening in said enclosure and including a sealing means comprising a polymer material having a durometer hardness in the range of from about 50 to about 95 SHORE A for sealing said first socket in said opening, whereby said light source can be replaced by removing said light module from said housing and removing said first socket from said light module.

102. The light module of claim 101 wherein said first socket is at least partially formed of a resilient polymer material so as to be self-gasketing at its mating surface to said enclosure.

103. The light module of claim 101 wherein said module is substantially moisture impervious.

104. A signal light module adapted to be removably positioned in an opening in a vehicle exterior mirror assembly comprising:

an enclosure having walls defining an enclosure cavity;

a light-transmitting opening in said enclosure cavity;

said opening being covered with a lens; and

a plurality of light-emitting diodes with louvers therebetween in said enclosure cavity;

wherein said light-emitting diodes radiate light generally along a light-radiating axis that extends rearwardly away from the passenger compartment of a vehicle in order to shield the driver from light radiated by said light-emitting diodes, said light-radiating axis being at an angle of at least approximately 15° from the longitudinal axis of the vehicle.

105. The signal light module of claim 104 wherein said light-radiating axis is at an angle of between approximately 25° and approximately 30° from the longitudinal axis of the vehicle.

106. The signal light module of claim 104 wherein said light-emitting diodes are solid-state light-emitting diodes.